



PAUL PIERLOTT (D041-1)

**Left: In a modern pilot plant at the Eastern Regional Research Center in Wyndmoor, Pennsylvania, food technologist Charles Onwulata works on development of processed foods and creation of unique biopolymers with production-scale extruders and an injection molding machine.**

PAUL PIERLOTT (D041-2)



**Inset: Whey-protein enriched corn curls. ARS scientists have developed a method to modify whey proteins, making them more compatible with starch and therefore easier to puff.**

## Creating Novel Foods and More From Agricultural Products

**T**he Eastern Regional Research Center (ERRC) in Wyndmoor, Pennsylvania, recently announced the opening of the Center of Excellence in Extrusion and Polymer Rheology (CEEPR).

The goal of the new center is to create value-added, novel foods, food ingredients, and nonfood or industrial biodegradable products from underused agricultural materials such as whey or corn byproducts. Current research projects cover a wide range of products, including snack foods, cheeses, meal replacement bars, pet foods, texturized proteins or meat substitutes, aquaculture feed, and nonfood materials such as films.

Scientists at ERRC work to create processes for converting corn and other grains into food and nonfood products. The waste streams from these processes will provide working materials for CEEPR projects.

The center features a modern pilot plant where new products can be developed from concept to prototype and eventually to full market production through technology-transfer collaborations. For example, they will develop processed foods and create unique biopolymers with production-scale extruders and an injection molding machine at ERRC.

Extrusion is a process of converting raw materials into new forms. The materials are first made into a semisolid mass, then forced through a die's restricted opening to create new shapes. According to Charles Onwulata, a food technologist in ERRC's Dairy Processing and Products Research Unit and CEEPR's

coordinator, the food industry uses rheology equipment, which helps determine the form, deformation, and flow properties of melted materials and the texture of resulting products. As Onwulata says, "The rheology of the product in the extruder affects the structure and texture of the finished product."

Knowledge of polymer rheology is essential in maintaining uniform textures in molded products such as, for example, an ice cream sandwich. ERRC's polymer work will use injection molding to create bioplastics from agricultural wastes.

Onwulata says they are forming partnerships with industry, other research agencies, and universities. In the past, Onwulata has collaborated with two sister agencies at the U.S. Department of Agriculture. He worked with the Animal and Plant Health Inspection Service to develop an insect feed and with the United States Agency for International Development to develop an extruded instant emergency food product needing no further cooking. Onwulata is also developing new ways to use whey proteins in enhancing the nutrition content of extruded crunchy snack foods.—By **Jim Core**, ARS.

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